REMARKS

Present Status of the Application

This is a full and timely response to the outstanding final Office Action mailed on December 15, 2005. The Office Action has rejected claims 9-11 and 14-18 under 35 U.S.C. 103(a), as being unpatentable over Chang et al. (U.S. 6,754,105; hereafter Chang) in view of Yoshikawa (U.S. 6,335,554; hereafter Yoshikawa) further in view of Forbes et al. (U.S. 2004/0004245; hereafter Forbes), and further in view of Kang et al. (U.S. 6,963,108, hereafter Kang).

Applicants traverse the rejection, but nevertheless have amended claim 9 to more clearly define the present invention. After entry of the foregoing amendments, claims 9-11, 14-18, remain pending in the present application. It is believed that no new matter is added by way of these amendments made to the claims or otherwise to the application. Applicants respectfully submit that the pending claims contain patentable subject matters. Withdrawal of the rejections and reconsideration of the claims are thus respectfully requested.

Interview Summary

The undersigned would like to thank Examiner Fazli Erdem for granting a telephonic interview on March 10, 2006, during which the 35 U.S.C. 103(a) rejection on claims 9-11 and 14 were discussed. More specifically, the undersigned and the Examiner discussed the rejections and the teachings of the Kang and the Yoshikawa references.

During the telephone interview, emphases were made to the Examiner that although the prior art Kang teaches a conformal ONO layer in the trench, Kang is silent about a spacer on the side of the gate to mitigate the hot carrier effect. Further, although Yoashikawa teaches a spacer on the side of gate, such a spacer is formed on a gate disposed above the substrate, rather than on the side of a "trench gate". The present invention teaches forming a "trench gate", where a part of the gate is above the substrate in order to have a spacer formed thereon. Therefore, not only the storage efficiency of the memory device is improved by forming a trench gate, the hot carrier effect can be reduced by having a spacer formed on the side of the gate.

After discussing these matters, the Examiner suggested that we file a response with the same arguments. The Examiner further indicated that he would enter an amendment to claim 9 that recites ".....a gate disposed over and completely filling the trench..., wherein a part of the gate is disposed above the substrate...." or **similar languages** to better define the invention.

Discussion of Office Action Rejections

The Office Action rejected the claims 9-11 and 14-18 under 35 U.S.C. 103(a), as being unpatentable over Chang in view of Yoshikawa further in view of Forbes, and further in view of Kang.

Applicants respectfully assert that Chang in view of Yoshikawa, Forbes and Kang is legally deficient for the purpose of rendering claim 9 unpatentable for at least the reason that not every element of the claim was taught or suggested by cited references such that

the invention as a whole would have been obvious to one of ordinary skill in the art.

Claim 9 teaches, among other things, "....a gate disposed over and completely filling the trench, wherein a part of the gate is protruded above the substrate; a plurality of spacers located on the sidewalls of the protruded part of the gate;.....".

With the same reasons discussed in the telephone interview, Applicants submit that the claimed invention defines over the prior art references for at least the reasons that the prior art Kang is silent about a spacer on the side of a gate formed in a trench, although Kang teaches a conformal ONO layer in the trench. With the presence of a spacer on the sidewall of the gate of the present invention, the hot carrier effect can be mitigated in order to better improve the reliability of the device. Further, although Yoshikawa teaches the application of a spacer, such a spacer is formed on the side of a gate disposed completely above substrate. The present invention, however, teaches forming a spacer on the sidewall of a "trench gate".

In brief, none of the prior art references either disclose or suggest forming a "trench gate", where a part of the gate is above the substrate in order to have a spacer formed thereon, so that not only the storage efficiency of the memory device is improved by forming a gate in a trench, the hot carrier effect can be reduced by having a spacer formed on the side of the gate.

For at least the foregoing reasons, Applicant respectfully submits that independent claim 9 patently defines over the prior art references, and should be allowed. For at least the same reasons, dependent claims 10-11 and 14-18 patently define over the prior art as well.

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CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 9-11 and 14-18 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,

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